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A tool for cleaning the hook part of a hook and loop fastening system

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ABSTRACT

A tool for cleaning the hook part of a hook and loop fastening system, (for instance Velcro™), the tool having a handle portion and a head portion, the head portion having a multiplicity of projections which are able to pass through the hook part to at least partially remove debris from the hook part.

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COMPLETE SPECIFICATION
FOR A STANDARD PATENT

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Invention Title:	A TOOL FOR CLEANING THE HOOK PART OF A HOOK AND LOOP FASTENING SYSTEM

The following statement is a full description of this invention, including the best method of performing it known to us:

A TOOL FOR CLEANING THE HOOK PART OF A HOOK AND LOOP FASTENING SYSTEM

This invention relates to a tool for cleaning the hook part of a hook and loop fastening system, an example of which is Velcro™.

Velcro™ is an example of a two component fastening system which comprises a first component including a plurality of loop portions projecting therefrom, and a second component including a plurality of hook portions projecting therefrom, said first and second components being arranged to be releasably secured to each other upon contact.

The hook and loop components are usually formed from tough plastics material which allows the two component fastening assembly to be re-used many times without appreciable deterioration of fastening strength.

The fastening systems have a multiplicity of very small hook portions per square centimetre with each hook being between 0.5 to about 2mm in length. The degree of fastening depends upon all, if not substantially all, of the hook portions becoming attached to the loop portions on the other part of the fastening system.

However, the hook portions very easily trap, attract and accumulate foreign debris such as fluff, hair and dirt. Because of the small nature of the hooks, even a small amount of debris can severely reduce the fastening integrity of the hook and loop fastening system.

Therefore, it is desirable to keep the hook portion as clean as possible at all times. One way to ensure a good level of fastening integrity is to regularly replace the hook and loop fastening system. However, replacement is not always convenient especially if the system is an integral part of a larger article.

Various attempts have been made to clean the hook part. However, most of these are not easy to use and may not result in sufficient removal of debris to ensure an acceptable fastening integrity of the hook and loop fastening system. For instance, one way of cleaning the hook part is to use another patch or strip of hook material which is vigorously rubbed over the first hook part. In essence, this transfers the debris from one of the hook

parts to another part of the hook parts which ultimately results in one of the hook parts needing to be discarded. Also, it appears that an acceptable cleaning rate is not possible. Another concern is that by using a hook part to clean a hook part, the hooks can damage each other resulting in a possible loss of fastening integrity.

Other more clumsier attempts have been made to clean the hook part including vigorous brushing with a hairbrush or a comb, but it seems that these are unable to properly clean the hook part presumably because the brush or comb has bristles which are unsuitable for the purpose of cleaning Velcro™.

It is also known to apply a high pressure jet of water or air to the Velcro™ surface in an attempt to blow away the accumulated debris, but this is quite unsatisfactory as it can wet or otherwise damage the article to which the fastening system is attached and it does not appear to provide a thorough cleaning action as the hook part can trap the debris quite strongly.

Therefore, it appears that current methods are unable or less able to properly clean the hook part which is necessary to ensure proper fastening integrity, and because the hooks are very small, even a small amount of debris can reduce the fastening integrity.

It is an object of the present invention to provide a tool which can clean the hook part of a hook and loop fastening system and which may at least substantially overcome the abovementioned disadvantages or provide the public with a useful or commercial choice.

In one form, the invention resides in a tool for cleaning the hook part of a hook and loop fastening system, (for instance Velcro™), the tool having a handle portion and a head portion, the head portion having a multiplicity of projections which are able to pass through the hook part to at least partially remove debris from the hook part.

In another form, the invention resides in a tool as described above wherein the projections are rigid pins which are all angled towards the handle portion and at between 20 to 80° relative to the head portion.

The tool is designed to enable cleaning of the hook part of a

hook and loop fastening system without using water or high pressure air, another hook patch, brushes or combs or other devices which do not appear to be entirely suitable.

The tool has a handle portion and a head portion. The handle portion enables the tool to be gripped by a person's fingers or hand and drawn over the hook part which is to be cleaned. As the cleaning action may be quite vigorous, it is preferred that the handle portion is configured to allow the tool to be gripped quite firmly. The handle portion may comprise an elongate projection which can pass into the person's hand and be gripped by the person's fingers but other types of handle portions are also envisaged, for instance handle portions that are gripped only by the person's fingers, handle portions having apertures through which a person's fingers can pass, or other configurations to assist in gripping the tool. A number of handle portions may be provided if suitable. The handle is preferably angled or positioned to keep the persons hand away from the quite rough hook portion when the tool is used.

The tool has a head portion which is associated with the projections which clean the hook part. The head portion is typically attached or otherwise operatively associated with the handle portion and is usually in the front of the handle portion. The size and shape of the head portion can vary, in part depending on the number and size of the hook cleaning projections. Typically, the head portion is between 5 to 20cm^2 and may be of various shapes, for instance rectangular, square, circular, oval, triangular or other shapes when viewed in plan.

The head portion can have a lower face from which the projections extend. It is preferred that the face is substantially planar in order to not interfere with cleaning of the hook part.

The projections are able to pass through the hook part to at least partially remove debris therefrom. The size, number and shape of the projections can vary in part depending on the size of the hook and loop fastening system. For hook and loop fastening systems where the hook part has an array of hooks which are between 0.5 to 3mm long, the projections

can be between 3 to 10mm long and between 0.5 to 2mm in diameter (if the projections are round pins) or in cross-section (if the projections are differently shaped).

In one form, the projections are sturdy pins typically formed from metal and are substantially rigid such that the projections can be rubbed quite hard through the hook part to remove as much debris as possible. By having the pins fairly small and thin, the pins can get in between the hooks of the hook part to provide a good cleaning action. By reducing flexing of the pins, debris can be more thoroughly removed.

In one form of the invention, the projections or pins are angled relative to the head portion. By having the pins angled, a better cleaning action is observed as the angled projections or pins can better get in, catch and remove the debris. While not wishing to be bound by theory, the angled projections or pins appear to provide a quite surprising improvement to the cleaning action of the tool.

In one form, the pins are angled towards the handle. This arrangement provides a good cleaning action by allowing the tool to be pulled across the hook part to be cleaned with the angle of the pins towards the handle portion appearing to provide a quite significant improvement to the cleaning action and the ability to clean the hook part with a reduced effort relative to other methods.

In order to provide a good secure attachment of the projections to the head portion, and to possibly minimise breaking off of the projections, the lower face of the head portion may be formed with an array of openings through which the projections pass. The projections can be fastened to some form of backing member which can be on the other side of the lower face. Alternatively, the projections may be fastened immediately about each opening through which the projection passes.

The projections can have rounded free edges which may be polished in order to provide an improvement to the cleaning efficiency.

In one form of the invention, a self-cleaning means is provided on the tool. The self-cleaning means may comprise the ability to retract the

pins entirely or substantially through the formed openings in the head portion with the pins being a rather close fit in the opening such that retraction of the pins will cause any accumulated debris to be pushed off the pins. In one form, the pins may be attached to a backing plate or some type of backing member which may be in the head portion and the head portion can be moved relative to the backing plate to cause the pins to retract.

In another form, the head portion may be detachable from the handle portion in order to allow various different shaped and sized head portions to be used. A particular type of releasable attachment means is considered desirable in order to allow a quick change while still providing a firm attachment and an embodiment of this is described below.

Embodiments of the invention will be described with reference to the following drawings in which

Figures 1A, B and C are side, bottom and top views of a tool according to an embodiment of the invention.

Figures 2A, B and C are side, top and bottom views of a tool similar to that illustrated in Figures 1A, B and C but having a self-cleaning system.

Figures 3A and B show a detachable tool according to an embodiment of the invention.

Referring to the drawings and initially to Figures 1A, B and C, there is illustrated a tool 10 for cleaning the hook part of a hook and loop fastening system of which Velcro™ is an example. Tool 10 has a handle portion 11 and a head portion 12. The head portion has a multiplicity of projections in the form of pins or teeth 13 which are able to pass through the hook part to at least partially remove debris from the hook part.

In the embodiment, handle 11 is formed of metal and has an ergonomic design to enable it to be gripped by a person's hand. Handle portion 11 has a length of approximately 120mm and a cross-section size of between 10mm at the thinner necked portion up to approximately 30mm at the rear thickened portion. The design of the handle is an embodiment only and is not limiting to the invention.

Head portion 12 in the embodiment is substantially square when viewed in plan (see Figure 1C) and has a length of approximately 30mm.

Handle 12 has a lower face 14 which is substantially flat and is also substantially square. The thickness of head portion in the embodiment is between 5 to 7mm.

The handle portion 11 and head portion 12 are formed integrally from metal such as aluminium but this can of course vary to suit.

Pins 13 are formed from rigid metal and are sturdy which means that they do not appreciably flex, bend or break during the cleaning action. In the embodiment, pins 13 are rearwardly facing and have an angle of typically between 20 to 80° relative to head portion 12 and are rearwardly angled in the sense that they are angled towards handle portion 11. This angle arrangement seems to quite significantly improve the cleaning action.

The pins are all identical and are formed in rows of approximately 5 to 15 or more pins, and in the embodiment illustrated in Figures 1A, B and C, are in rows of about 5 or so pins. Each pin projects from the lower face 14 by approximately 4 to 5mm and each pin is round and has a diameter or slightly less than 1mm. The free ends of the pins are rounded and can be polished in order to further improve the cleaning action. The spacing between the pins in a particular row is between 3 to 5mm as is the spacing between adjacent rows. This arrangement provides an excellent cleaning action by ensuring that the pins can extend right into the hook portion to thoroughly clean it.

In the embodiment, pins 13 extend through corresponding apertures (better illustrated in Figure 2C) in face 14. The pins are all attached to a backing plate 15 (not illustrated in Figures 1A, B or C, but illustrated in Figure 2A), which means that the pins can all be attached to the backing plate and then passed through the openings in face 14. This appears to further ensure a good, strong, reliable robust tool.

Figures 2A, B and C illustrate a tool which is similar to that illustrated in Figures 1A, B and C but which includes a self-cleaning means. The self-cleaning means in this embodiment is best illustrated in Figure 2A

and consists of backing plate 15 to which each of the pins 13 is rigidly attached. Backing plate 15 is rigidly attached to handle portion 11 and itself does not move. The head portion 16 is substantially hollow and is not rigidly fixed to handle portion 11 or backing plate 15. Instead, head portion 16 can move downwardly against the bias of a spring 17 which causes retraction of pins 13 into head portion 16. The top of head portion 16 can have a thumb depressible portion 18 such that depression of portion 18 causes the head portion to push downwardly against the bias of the springs to at least partially retract pins 13 into the head portion. The apertures (see Figure 2C) through which the pins pass are only slightly larger than the pins themselves which means that the retraction causes dislodgment of any accumulated lint or debris on the pins.

Figures 3A and B illustrate a tool having a detachable head portion. This tool has a handle portion 19 and various head portions two of which are illustrated as reference numerals 20 and 21 and are different in the size and therefore the number of cleaning pins 13. Handle portion 19 has an internal bore 22 extending substantially through the handle portion and which has an open end 23. Each head portion 20, 21 has a coupling rod 24 which slides into bore 22. Coupling rod 24 has a pair of diametrically opposed anti-rotation splines 25 which pass into corresponding slots 26 when the handle is attached and which prevents rotation of head portion relative to handle portion.

At the rear of handle portion 19 and at the rear of bore 22 is a releasable locking mechanism 27 which comprises a depressible button 28, a spring 29, and an aperture 30 in button 28 which locks against an annular groove 31 on rod 24.

Depression of button 28 against the bias of spring 29 will release head portion 20 or 21 to allow it to be interchanged.

It should be appreciated that various other changes and modifications may be made to the embodiment described without departing from the spirit and scope of the invention.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A tool for cleaning the hook part of a hook and loop fastening system, (for instance Velcro™), the tool having a handle portion and a head portion, the head portion having a multiplicity of projections which are able to pass through the hook part to at least partially remove debris from the hook part.

2. The tool of claim 1, wherein the head portion has a contact surface area of between 5 to 20cm^2.

3. The tool of claim 1 or claim 2, wherein the head portion has a lower face, the projections extending from the lower face, the face being substantially planar.

4. The tool of any one of the preceding claims, wherein the projections are substantially rigid pins which have a length of between 3 to 10mm, and a thickness of between 0.5 to 2mm.

5. The tool of claim 4, wherein the pins are all angled towards the handle portion and at between 20 to 80° relative to the head portion.

6. The tool of any one of the preceding claims, wherein the head portion has a lower face formed with openings, a backing member positioned behind the lower face, the projections being attached to the backing member and passing through the openings in the lower face.

7. The tool of any one of the preceding claims, wherein the head portion has a lower face formed with openings, the projections passing through the openings and being fixed to the lower face immediately about the openings.

8. The tool of claim 5, wherein the projections have rounded free edges.

9. The tool of any one of the preceding claims, wherein the head portion has a lower face formed with openings, the projections being moveable between a retracted cleaning position where the projections retract at least partially through the openings in the head portion, and an extended use position where the projections extend through the openings, the projections being a close fit in the openings such that retraction of the

projections can cause any accumulated debris to be pushed off the projections.

10. The tool of claim 9, wherein the projections are rigid pins.

11. The tool of claim 10, comprising a backing plate, the pins being attached to the backing plate, the head portion being moveable relative to the backing plate to cause the pins to retract.

12. The tool of any one of the preceding claims, wherein the head portion and the handle portion have releasable attachment means.

13. The tool of claim 12, wherein the handle portion has an internal bore extending substantially through the handle portion and which has an open end, the head portion having a coupling rod which slides into the bore, the coupling rod having a pair of diametrically opposed anti-rotation splines which pass into corresponding slots in the bore when the handle is attached and which prevents rotation of head portion relative to handle portion, and a releasable locking mechanism at the rear of the rod and at the rear of the bore which comprises a depressible button on the handle portion which is biased by a spring, the button having and an aperture which is adapted to lock against an annular groove on rod.

DATED this 10th day of October 2000

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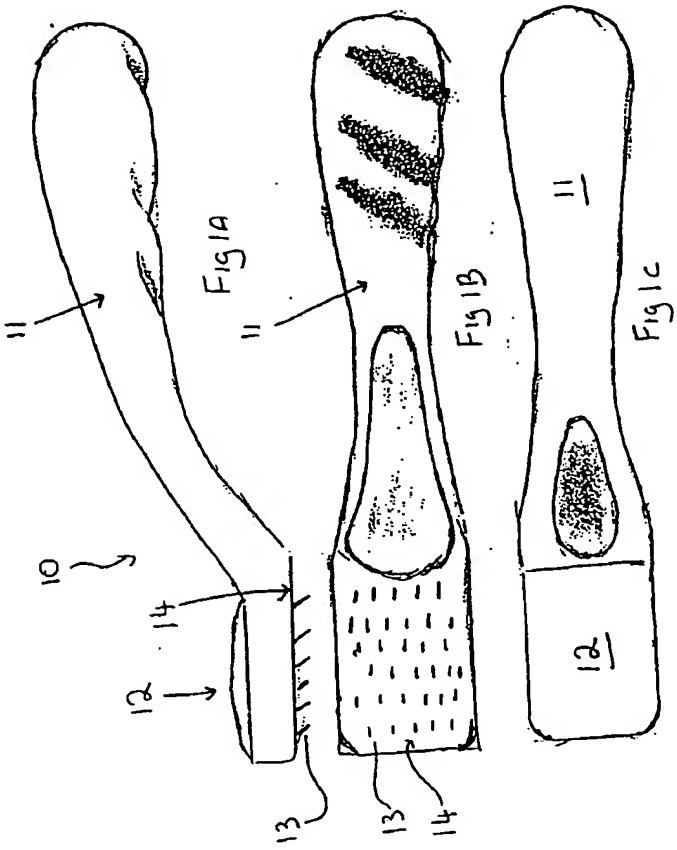
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14
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Fig 1A
11
13
14
Fig 1B
11
12
Fig 1C

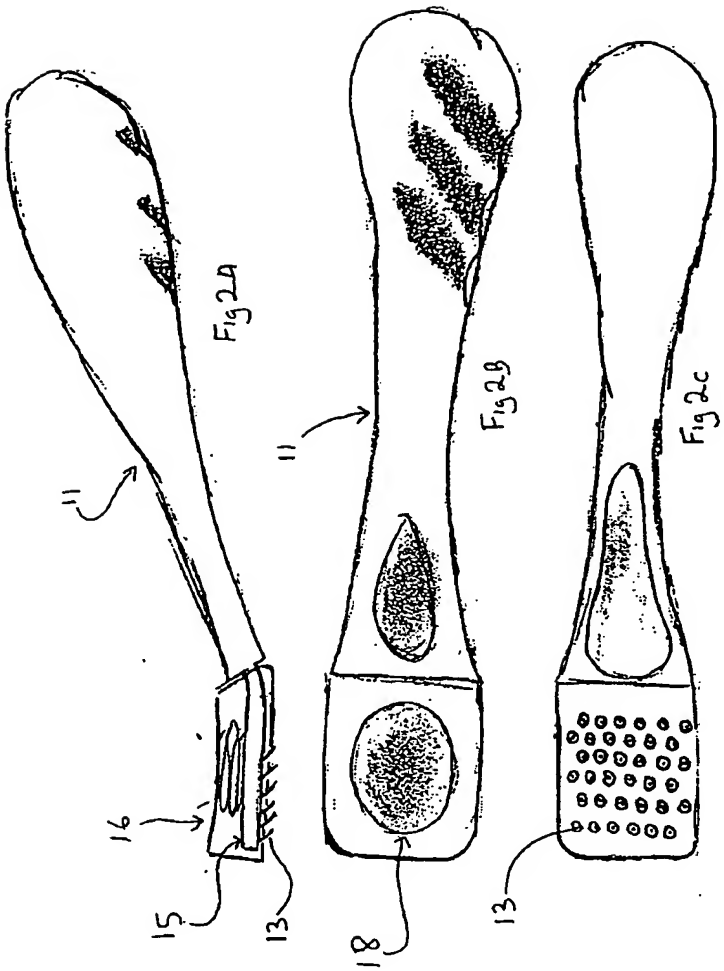
Fig 2A
Fig 2B
Fig 2C
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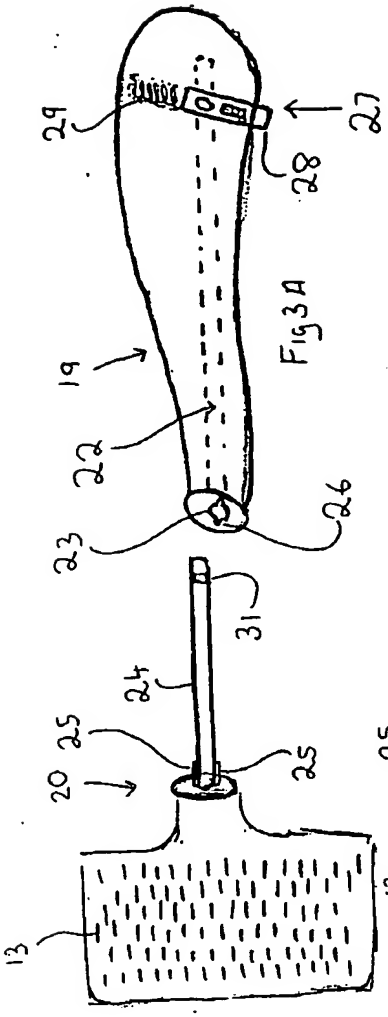

Fig 3A

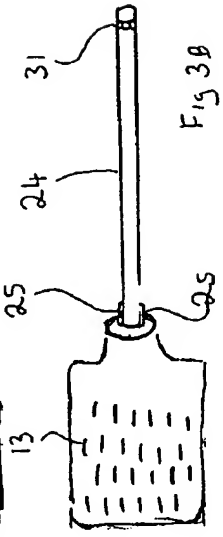

Fig 3B